



African Breakthroughs To Make Life Better

In the last 50 years, the domestication of high technology - bringing cheaper access to everything from personal computers to digital cameras and applications like global positioning systems (GPS) - has transformed millions of lives and the way business is done. In the next 50 years, biotechnology is set to do the same.

One aspect of biotechnology, genetic engineering (GE), has been lambasted by protest groups for being "unnatural" and driven by profit and the privatisation of nature. It has been seen as the domain of the big and powerful and remote from everyday needs. But now Africa is pioneering new approaches that are rooted in the real challenges faced by African people - and proving world-class scientific research can take place in Africa.

One initiative in South Africa aims to help small and medium sized farmers save their maize (corn) crops. The Food and Agriculture Foundation estimates that 854 million people in the world do not have sufficient food for an active and healthy life, and food security is a serious issue in Africa.

Maize streak viruses (MSV) are geminiviruses that destroy maize crops, and are a big problem throughout sub-Saharan Africa and the Indian Ocean islands. It leaves characteristic yellow-white streaks across the plant's leaves, and produces deformed corn cobs, often severely dwarfed. Over half of the food supply for people in sub-Saharan Africa comes from maize, but MSV can wipe out an entire farmer's crop.

[Scientists at the University of Cape Town](#), South Africa, and the South African seed company PANNAR Pty Ltd have developed a resistant variety of maize that they hope will alleviate food shortages as well as promote the reputation of genetically engineered (GE) foods in Africa.

The MSV-resistant maize is the first GE crop developed and tested solely by Africans. Field trials will soon begin to make sure there are no unintended consequences on the environment and animal life dependent on maize.

Maize arrived in Africa in the 1500s from Mexico, and quickly displaced native food crops like sorghum and millet. Maize streak virus is an endemic pathogen of native African grasses, and is passed on to maize plants by leaf hopping insects.

The technology being developed can also be applied to other geminiviruses, like Wheat dwarf virus (WDV), sugarcane streak virus, barley, oats and millet. The scientists hope this development will prove the safety of GE foods, and address the criticism it is only a profit driven technology by selling the seeds for minimal profit to subsistence farmers.

"If the GE maize turns out to be as hardy in the field as in the greenhouse," said Dr Dionne Shepherd, who leads the research, "it could have a great impact on small and medium sized farmers. These are the farmers who need it the most, since they can't afford preventative measures such as insecticides to control the leafhopper which transmits the disease. When small scale farmers lose 100 per cent of their crop (which they often do) due to maize streak disease, they not only lose any income they would have obtained selling their excess maize, but they also lose a massive chunk of their annual food supply."

In this issue:

- [African Breakthroughs To Make Life Better](#)
- [Traditional Medicine is now a Proven Remedy](#)
- [Mobile Phones: Engineering South's Next Generation of Entrepreneurs](#)
- [Saving Water to Make Money](#)

Featured links:

- [Babajob.com](#)
- [Equator Initiative](#)
 - [Kiva.org](#)
 - [SSC Website](#)

Skip to a section:

- [Window on the World](#)
- [Job Opportunities](#)
- [Past Issues](#)

Other African institutions are working on GE crops with international partners, but, Shepherd, says, "The reason the MSV-resistant maize could improve the reputation of GE in Africa, is that international biotech partners, especially in the private sector, are generally not interested in solving problems that are unique to Africa, and Africans are therefore suspicious of their motives when they try to sell or even give away GE food."

"MSV is endemic to sub-Saharan Africa, and our MSV-resistant maize was developed by Africans for Africa with no ulterior motives, which will hopefully make Africans accept the technology."

"I think it should attract more funding, because once international funders see that world-class research can happen in Africa, they may be more willing to commit funds."

In another development, African science is tackling the scourge of malaria on the continent. Caused by a parasite carried by mosquitoes, it kills more than a million people a year and makes 300 million more seriously ill (World Health Organisation). Ninety per cent of the deaths are in Africa south of the Sahara, and most are children.

While bed nets, insecticides and anti-malarial drugs are effective, the disease has become resistant to some drugs and work on a vaccine is slow.

Research in Kenya has found an effective way to both provide food and destroy mosquito larvae. The Nile tilapia - a highly nutritious fish has long been known to feed on mosquito larvae. But nobody has made the connection between this fact and the fight against malaria. Francois Omlin, a researcher at the [International Centre of Insect Physiology and Ecology in Nairobi, Kenya](#), has conducted the first field tests to prove this approach.

"The tilapia species was never tested in the field for its ability to eat mosquito larvae," he told Reuters.

Ten days after introducing the tilapia to a pond, they had destroyed most of the larvae and after 41 weeks the number of mosquitoes fell by 94 per cent, according to Omlin.

This means two important goals can be served by harvesting tilapia fish: greater access for Africans to the nutritious fish, and a dramatic reduction in mosquito-borne malaria.

LINKS:

- International Centre of Insect Physiology and Ecology: www.icipe.org.
- More on tilapia as food: www.washingtonpost.com.
- More about corn in the African diet: www.congocookbook.com.

Traditional Medicine is now a Proven Remedy

Once dismissed as old fashioned, ineffective and unscientific, traditional medicine is now seen as a key tool in bringing healthcare and healing to poor people bypassed by existing public and private health measures.

Acknowledging traditional medicine as a useful tool goes back to the [World Health Organisation's Alma-Ata Declaration in 1978](#), which urged governments for the first time to include traditional medicine in their primary health systems and recognise traditional medicine practitioners as health workers. During the last 30 years there has been a considerable expansion in the use of traditional medicine across the world. Despite their ancient origins, it is still critical these medicines do meet efficacy and health standards and are proven to work.

In Mongolia, when the Soviet Union collapsed a decade and a half ago, new market forces meant that supplies of conventional medicines became prohibitively expensive for most of the population. With one doctor for 600 people in the rural areas - and the vast distances to be covered - medical services were virtually unobtainable in rural communities.

This situation led to a revival of Mongolia's 2,000-year-old traditional medicine. This includes acupuncture, cauterisation, manual therapy, blood letting and therapies using mares' milk - all integral to the rural way of life.

Research by the [Japanese Nippon Foundation](#) - the largest private foundation in Japan - explored how Mongolia's public health care could be improved through traditional medicine. It focused on the possible use of traditional medicine alongside Western medicine, the depth of faith in traditional medicine, the affordability of traditional medicine, and the lifestyles of herdsman living in remote areas away from hospitals. The project, launched in 2004, distributes medical kits with 12 types of traditional medicines to households in rural areas. As they use them, the households pay for them. The kits, which mostly target stomach and intestinal ailments and fever, have so far been distributed to 10,000 households (50,000 people) across the country. The Foundation found doctors' house calls were down by 25 per cent after one year of the project.

In India, Gram Mooligai and its Village Herbs label helps bring quality healthcare to the country's 170 million rural poor currently left out by public healthcare programmes, or who can't afford private services. At present, the Indian government has been unable to find adequate funds to provide healthcare to all its people. Gram Mooligai uses a network of 300 women health practitioners to reach villagers who spend on average US \$50 a year on health services - so far, they reach 30,000 households. It has built trust with the poor by offering herbal remedies based on India's strong Ayurvedic heritage of herbal healing. It also draws on India's rich biodiversity by harvesting medicines sustainably from native plant species - over 18,000 are known.

The company is owned by a network of rural growers that manufacture herbal remedies like Trigul balm for joint pain, Sugam cough syrup and Jwaracin fever reducer. Gram Mooligai combines modern healthcare with local remedies familiar to rural villagers.

The website gives a good example of this folksy approach. In answer to a villager whose daughter is complaining of pain in her legs and back, the villager is advised to give her milk and ghee (clarified butter). "Add nuts and dry fruits to her daily diet in small quantity. If she is lean, then a weekly massage with Lakshadi Thailam (which is available in the Ayurvedic shops) is very useful. Slightly warm the oil before massage and add a pinch of common salt to the oil for better absorption."

LINKS:

- Mongolian Traditional Medicine Website: www.baigal.com.
- Asia-Pacific Traditional Medicine and Herbal Technology Network: an excellent first stop for any entrepreneur, where they can find out standards and regulations and connect with education and training opportunities: www.apctt-tm.net and www.aptm.cn.

Mobile Phones: Engineering South's Next Generation of Entrepreneurs

Technology is fuelling unprecedented growth in productivity in Asia, with sub-Saharan Africa languishing behind (International Labour Organization). But the growth in mobile phones could help close this gap, as home-grown entrepreneurs are stepping up to exploit this new opportunity.

Mobile phone applications are proving a boon to small businesses and entrepreneurs. They are now putting power in the hands of individuals, making it easier to invent new ways of doing things, transfer money, organise business accounts, provide services, sell things, and keep in touch and up-to-date.

Technology has been the common factor in increases in productivity around the world, and with the rapid rise in mobile phone use, especially in Africa, it looks as if this handy device augers in the next wave of innovation.

And technology and mobile phones in particular, are creating a whole new route to wealth: "The switch... frees people from geography," Gregory Clark, an economic historian at the University of California, Davis told The Christian Science Monitor. "Singapore can be as rich as Canada, even though Singapore has no land."

Technology is seen to be opening a new phase in economic competition in services, embracing a wide range of fields, from banking to tourism to healthcare. And it is entrepreneurs who will be at the forefront of making this happen. The majority (59 per cent) of the world's 2.4 billion mobile phone users live in developing countries (MIT) - making it the first telecommunications technology in history to have more users there than in the developed world. The number of African mobile phone users passed 200 million at the beginning of this year (www.ovum.com), making it the fastest growing mobile phone market. It has increased at an annual rate of 65 per cent - twice the global average (MIT Media Laboratory).

In Kenya in 2005, the government's Economic Survey found the small business sector, which employs the majority of workers in the nation of 32 million people, created 437,900 jobs - mostly down to the boom in mobile phones. According to the Massachusetts Institute of Technology (MIT), adding an additional 10 mobile phones per 100 people boosts a typical developing country's GDP growth by 0.6 per cent. The boost comes from the innovative use of mobile phone technology by local entrepreneurs.

At the University of Nairobi, the SMS Boot Camp (SMS is the text messaging system on mobile phones) is breeding the next generation of African technology entrepreneurs. Working in partnership with MIT, the student entrepreneurs are working on an impressive list of projects, which can be found online at eprom.mit.edu. The projects are varied, and include perfecting prototype ways to collect medical data on mobiles, accurately tracking phone user's profiles (habits, friend networks etc.), improving communication between Kenyan hospitals and the centralised blood banks in the country, and quick ways to install applications on all of Kenya's mobile phone SIM cards.

One graduate, Mohammed Temam Ali in Addis Ababa, is now working on a project for the Ethiopian Telecommunications Company. Another is working for Kenyan mobile phone download service, Cellulant.

[Nathan Eagle](#), a visiting lecturer at the University of Nairobi, has been working with the students on the projects: "Phones are starting to be used as a surrogate for all sorts of technology we take for granted in the West. Credit cards, TVs, radios, computers, etc... In the small Kenyan village where I'm writing this email, I can pay for the taxi ride home with my mobile -- we're even scheduled to be getting a Wimax network (wireless internet) here next year. Talk about leapfrog..."

"I'm also advising a small group of newly graduated Rwandan hackers who are building an SMS-based payment system for electricity."

But Eagle says the obstacles can still be huge: "Government corruption and red-tape. SMS is illegal in Ethiopia... it is pretty frustrating when you go over to teach an 'sms bootcamp' class."

In India, where there are 185 million mobile phone subscribers, computer science doctoral student and founder of [Ekgaon Technologies](#), Tapan Parikh, has founded a business specifically targeting developing mobile phone-based information systems for small businesses in the developing world. Working in rural India, the applications are designed to make it easier for business owners to manage their own operations in an efficient and transparent way, and also to build strong connections both with established financial institutions and their customers. By making it easier to access finance, and also to get a better price, these businesses will stand a better chance of flourishing, it is believed.

One of his applications is called Cam (named after the phone's camera). It is a toolkit that makes it simple to use phones to capture images and scan documents, enter and process data, and run interactive audio and video.

Parikh is also using these applications to improve micro-finance. Targeting Indian self-help groups (15 to 20 people who pool their capital together, usually women), the application (called SHG MIS - self-help group management and information system) uses the phone's camera to enter data, uploading it to online databases, and a package of Web-based software for managing data and reporting to the institution that

lent the money.

"In these groups, things are often done in a somewhat ad hoc manner, using informal documentation," Parikh says, "which can lead to instability and impermanence and contribute to the kinds of tensions that lead small groups to fall apart." The software gives groups a more systematic method of documenting decisions, tracking financial performance over time, and collecting information on loan effectiveness. Parikh has developed his applications around the needs and behaviour of the users.

This next wave of entrepreneurs will be joining a growing list of made-in-the-South mobile phone innovators like [ARYTY](#), and [Smart Money](#) in the Philippines; [WIZZIT](#) and [MTN Mobile Money](#) in South Africa; M-Pesa in Kenya; [Celpay](#) in Zambia and the Democratic Republic of Congo.

LINKS:

- Key Indicators of the Labour Market, 2007: www.ilo.org
- Commission for Africa report on mobile phones and development: www.commissionforafrica.org
- The Massachusetts Institute of Technology and the University of Nairobi are training the next generation of mobile phone entrepreneurs with their "SMS Boot Camp", focused on developing applications for African phone users: eprom.mit.edu.
- Entrepreneurs can track the growth of the mobile phones market here: www.wirelessintelligence.com



Saving Water to Make Money

"The world's water supplies are running low, and according to the World Health Organisation (WHO), four out of every 10 people are already affected. But despite the gloomy reality of this problem, entrepreneurs in the South are rising to the challenge to save water.

"The situation is getting worse due to population growth, urbanisation and increased domestic and industrial water use," said WHO's Director-General, Dr Margaret Chan. While the WHO has adopted the theme 'Coping with Water Scarcity' for this year, every year more than 1.6 million people die from lack of access to safe water and sanitation. Ninety percent of these deaths are children under the age of five.

The health consequences of water scarcity include diarrhoeal diseases such as cholera, typhoid fever, salmonellosis, other gastrointestinal viruses, and dysentery.

One unnecessary waste of water is car washing. The number of cars in developing countries is growing fast, with a 27 per cent increase in sales in China this year, and South America overtaking Asia as the world's fastest-growing regional vehicle market (Global Auto Report). And all these cars will be washed, wasting this precious resource.

The large informal car washing market in Brazil has long been known for paying low wages and avoiding taxes. On top of this they also waste water. Lots and lots of water. In Brazil, 28.5 per cent of the population (41.8 million people) do not have access to public water or wastewater services. And 60 per cent do not have adequate sanitation (Brazilian Institute of Applied Economic Research).

Started in 1994, [Drywash](#) uses a locally available Brazilian organic carnauba wax to clean cars without using water. Drywash has also developed a line of cleaning products that cleans every part of a car without the need for water. They estimate they have saved 450 million litres of water in their first 10 years of operation. From the start, they set out to change the status quo and run a business that "thinks like a big corporation," said its international partner, Tiago Aguiar.

To do this, Drywash's management team focused on operating an efficient and professional business. When Brazil's government passed strict laws against informal selling of products, Drywash was well positioned to benefit, with companies preferring to work with a legal business. Customers have also been attracted to Drywash because they know the service is consistent and to a high standard. Drywash made US \$2.7 million in 2005.

Drywash prides itself on operating "on the books", and paying taxes. They are also ambitious, and have expanded outside Brazil and into other services.

And they don't just do private cars: they also clean private jets, with Drywash Air. They have also expanded into Mexico, Portugal and Australia, on top of 50 Brazilian franchises. They also want to enter the US market.

In China, [Landwasher toilets](#) is tackling the growing problem of providing flush toilets to the country's 1.32 billion people. As its founder Wu Hao told the World Resources Institute (www.nextbillion.net), "Assuming all of our country uses water-flushing toilets, not even the Changjiang and the Yellow Rive will be enough."

Formed six years ago, it has patented a process using a special agent and sterilisation to dispose of human waste without using water, and very little electricity.

Hao graduated from Beijing University's Physics Department and developed management experience working in manufacturing, securities investment and corporate management.

"On a personal level, I love the natural environment... I can't endure the large scale waste and damage to the environment caused by the process of construction in China."

Landwasher has seen its sales grow to 40 million Yuan (US \$5.2 million), and has six sales offices covering 27 provinces.

Landwasher has just been awarded a contract to provide portable toilets to the 2008 Olympics in Beijing.

LINKS:

- [World Water Council](#): Established in 1996, the World Water Council promotes awareness and builds political commitment to trigger action on critical water issues.
- [Water Supply and Sanitation Collaborative Council](#): Works on sustainable sanitation, hygiene and water services to all people, with special attention to the underserved poor.
- [The Stratus Group](#) is a Brazilian fund looking for sustainable SMEs in Brazil's high-growth green sectors.

- **Reducing Global Poverty: The Case for Asset Accumulation**

by Caroline O.N. Moser, editor, Publisher: Brookings Institution Press

Website: www.amazon.com

- **A Farewell to Alms: A Brief Economic History of the World**

by Gregory Clark, Publisher: Princeton University Press

Website: www.amazon.com

- **India special supplement in The Guardian newspaper**

Website: www.guardian.co.uk

- **Damned by Debt Relief: A Ghanaian film on the impact of debt relief programmes**

Website: www.spiked-online.com

Job Opportunities

- [Africa Recruit Job Compendium](#)

- [Africa Union](#)

- [CARE](#)

- [Christian Children's Fund](#)

- [ECOWAS](#)

- [International Crisis Group](#)

- [International Medical Corps](#)

- [International Rescue Committee](#)

- [Internews](#)

- [IREX](#)

- [Organization for International Migration](#)

- [Oxfam](#)

- [Relief Web Job Compendium \(UN OCHA\) \(1\)](#)

- [Relief Web Job Compendium \(UN OCHA\) \(2\)](#)

- [Save the Children](#)

- [The Development Executive Group job compendium](#)

- [Trust Africa](#)

- [UN Jobs](#)

- [UNDP](#)

- [UNESCO](#)

- [UNICEF](#)

- [World Bank](#)

- [World Wildlife Fund \(Cameroon\)](#)



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